Ultrasonic Plaque Echolucency and Embolic Signals Predict Stroke in Asymptomatic Carotid Stenosis

Topakian R, King A, Kwon SU, and the Aces Investigators. Neurology 2011;77:751-8.

Conclusion: Plaque morphology predicts ipsilateral stroke in asymptomatic carotid stenosis (ACS). The combination of embolic signal (ES) detection and plaque morphology provides greater prediction than either measure alone and can identify a high-risk group with an annual stroke rate of 8% and a low-risk group with a stroke rate of <1% per year.

Summary: Intervention for high-grade ACS is increasingly questioned. There is evidence that, over the last decade, stroke risk with ACS has fallen with medical intervention alone (Abbott AL, Stroke 2009;40:e573-83; Marquardt I et al, Stroke 2010;41:e11-7). Nevertheless, although the percentage of patients with ACS who actually have a stroke is small, most ipsilateral strokes in patients with carotid stenosis are unheralded (Inzitari D et al, N Engl J Med 2000;342:1693-700). In this study, the authors examined the predictive value of a score based on plaque morphology and detection of ES with transcranial Doppler. Data were derived from the prospective, observational, international multicenter Asymptomatic Carotid Emboli Study (ACES). This study included 435 subjects with ACS >70% with baseline ultrasound images and transcranial Doppler data available. Prospective follow-up was for 2 years. Plaque morphology was graded using a classification system proposed by Geroulakos et al (Br J Surg 1993;80: 1274-7). In this system, type 1 plaques are uniformly echolucent, type 2 plaques are predominately echolucent (>50% of the plaque), type 3 plaques are predominately echogenic (>50% of the structure of the plaque), type 4 plaques are uniformly echogenic, and type 5 plaques cannot be classified because of heavy calcification or poor-quality images. Overall, type 1 and type 2 plaques are considered echolucent and type 3 and 4 plaques echogenic. In this study, 164 of the plaques (37.7%) were graded echolucent. At baseline, plaque echolucency was associated with an increased risk of ipsilateral stroke alone (hazard ratio, 6.43; 95% confidence interval, 1.36-30.44; $P = .019$). Combining plaque echolucency and ES positivity at baseline was associated with a marked increased risk of ipsilateral stroke alone (hazard ratio, 10.61; 95% confidence interval, 2.98-37.82; $P = .003$). Controlling for risk factors such as degree of carotid stenosis and antiplatelet medication did not alter this association.

Comment: Data justifying prophylactic endarterectomy for asymptomatic carotid stenosis is now quite old. Results of surgery, angioplasty, and medical management of asymptomatic carotid stenosis are likely better now than a decade or two ago, but at a minimum, >20 carotid interventions for patients with asymptomatic carotid stenosis are needed to prevent one major stroke. There clearly needs to be a better approach to selecting patients with asymptomatic carotid stenosis for prophylactic endarterectomy. However, I doubt the approach presented here will be the answer. The classification system of carotid plaques described by Geroulakos et al has been available for many years and is simply not used, and embolic signal monitoring, as performed in the ACES study, is too cumbersome to be incorporated into routine clinical practice.

Asymptomatic Carotid Artery Stenosis and Cognitive Outcomes After Coronary Artery Bypass Grafting

Norkienė I, Samalavičius R, Ivaškevičius J, et al. Scand Cardiovasc J 2011; 45:169-73.

Conclusion: Asymptomatic >50% carotid stenosis is a risk factor for cognitive decline after coronary artery bypass grafting (CABG).

Summary: Patients anticipate CABG will improve their quality of life (Koch CG et al, Semin Cardiothorac Vasc Anesth 2008;12:203-17). Preservation and improvement of psychologic emotional well-being enhances quality of life. Neuropsychologic disorders are being more frequently addressed in the care of the postoperative patient. Cerebrovascular disease and coronary artery disease potentially put patients at risk for cognitive decline. In this report, the authors correlate asymptomatic carotid stenosis with cognitive decline after coronary artery bypass grafting (CABG). They sought to detect the incidence of cognitive decline after CABG, identify risk factors associated with such cognitive decline, and investigate a possible link between cognitive performance and asymptomatic carotid stenosis.

The authors studied 127 patients who underwent CABG. The patients underwent a neuropsychologic examination that included seven cognitive tests and two scales for evaluation of mood disorders. The patients were tested the day before surgery and before discharge from the hospital. Testing revealed that early postoperative decline was common and was detected in 46% of patients. Postoperative cognitive decline was associated with low cardiac output syndrome perioperatively ($P < .05$), postoperative bleeding ($P = .03$), longer duration of surgery ($P = .02$), and longer intensive care unit stay and postoperative mechanical ventilation time ($P < .05$). Multivariate regression analysis indicated carotid artery stenosis of >50% was a strong independent predictor of postoperative cognitive decline (odds ratio, 26.9; 95% confidence interval, 6.44-112.34).

Comment: The authors' data indicate an association between cognitive decline after CABG and the presence of >50% carotid stenosis. One cannot, however, derive from this data that the carotid stenosis itself leads to cognitive decline after CABG. Indeed, we know that repair of asymptomatic carotid stenosis before CABG has minimal, if any, impact on more obvious clinical end points such as stroke and death after CABG. This study did not have cerebral imaging before and after CABG to correlate with the neurophysiologic testing. At this time, it seems more likely the carotid stenosis is more of a marker for more advanced preexisting intracranial vascular disease potentially associated with cognitive decline after CABG than a potential target for intervention to decrease cognitive decline after CABG.

Systematic Review of Exercise Training or Percutaneous Transluminal Angioplasty for Intermittent Claudication

Frans FA, Bipat S, Reekers JA, et al. Br J Surg 2012;99:16-28.

Conclusion: The combination of percutaneous transluminal angioplasty (PTA) and exercise therapy (ET) may be superior to ET or PTA alone for treatment of intermittent claudication.

Summary: One goal in patients with intermittent claudication is to improve walking distance with the thought that improved walking distance will improve quality of life. PTA, surgery, drugs, and ET all potentially improve symptoms in patients with intermittent claudication. Systematic reviews have demonstrated superiority of supervised ET (SET) over unsupervised ET for increasing pain-free and maximum walking distance (Bendermacher BL et al, Cochrane Database Syst Rev 2006;CD005263; Wind J et al, Eur J Vasc Endovasc Surg 2007;34:1-9). A Cochran review (Fowkes FG et al, Cochrane Database Syst Rev 2000;CD000017) indicted greater short-term benefit with PTA than ET in patients with intermittent claudication, but that the effect was not sustained after 1 to 2 years. A second review found medical treatment (home or SET, plus risk factor modification) resulted in longer walking distances than PTA at 1 to 2 years (Wilson SE, Ann Vasc Surg 2010;24:498-502). The authors noted that since this review, six additional randomized clinical trials have compared PTA and ET. They performed a systematic review to summarize the results of all currently available randomized clinical trials comparing PTA with ET therapy, with the goal to obtain the best estimate of the relative effectiveness of PTA and ET.

This was a systematic review of relevant randomized clinical trials identified from the MEDLINE, Embase, and Cochrane Library Databases. To be included in the review, the trial had to compare PTA with ET in patients with intermittent claudication secondary to aortoiliac or femoral popliteal occlusive disease, or both. There were 258 initial articles identified, with 11 (reporting data on eight trials) meeting inclusion criteria, including one trial with isolated aortoiliac obstruction, three trials with femoropopliteal disease, and five with combined lesions. Two trials compared PTA with advice for ET, four trials compared PTA with SET, two trials compared PTA plus SET with SET alone, and two trials compared PTA plus SET with PTA alone. The authors concluded that heterogeneity precluded pooling of the data even though the end points in most trials were walking distance and quality of life. Their analysis indicated the effectiveness of PTA and ET was equivalent, although PTA plus ET provided greater improvement of walking distance and some domains of quality of life analysis compared with PTA alone or ET alone.

Comment: The article provides the most up-to-date information on the effectiveness of ET and PTA for treatment of intermittent claudication. SET and PTA can both be effective in improving walking distance in patients with claudication. Neither therapy is perfect. ET is noninvasive, relatively inexpensive, and has less risk compared with PTA. However, PTA may be more universally applicable and more quickly effective. Eventual failure rates are high with PTA, but angioplasty of infrainguinal arteries is a moving target, with potential improvements of percutaneous techniques such as drug-eluting balloons and stents shortly down the road. Two important questions not addressed in this study include the cost-effectiveness of each treatment strategy and the potential for each treatment strategy to convert patients from claudication to critical limb ischemia with therapy failure.

Stenting Versus Surgery in Patients With Carotid Stenosis After Previous Cervical Radiation Therapy: Systematic Review and Meta-Analysis

Fokkema M, den Hartog AG, Bots ML. Stroke 2012;43:793-801.

Conclusions: In patients with carotid stenosis after previous cervical radiation therapy, carotid artery stenting (CAS) and carotid endarterectomy (CEA) are both feasible revascularization techniques with a low risk of cerebral vascular events. Patients undergoing CEA have more temporary cranial nerve injuries. There are higher rates of late adverse cerebral vascular events and restenosis after CAS than CEA.

Summary: CAS is proposed as a minimally invasive alternative for patients considered high risk for perioprocedural events with CEA. Patients may be high risk from anatomic or clinical factors. One anatomic factor considered by some to impart increased risk for CEA is previous cervical radiation therapy. However, previous radiation therapy may accelerate rates of restenosis and subsequent cerebral events in patients treated with CAS or